PATENT

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By: William C. Milks, III
William C. Milks, III

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of:	
ROBERT R. MILKS	Examiner: Richard M. Kearse
SC/Serial No. 07/142,525	Group Art Unit No. 125
Filed: January 11, 1988	DECLARATION OF SANFORD D. PORTER UNDER RULE 132 (37 C.F.R. SECTION 1.132)
For: IMPORTED FIRE ANT INSECTICIDE	Santa Rosa, CA 95405 August 11, 1989

Honorable Commissioner of
Patents and Trademarks
Washington, D.C. 20231

Sir:

This Declaration is submitted in accordance with Rule 132 (37 C.F.R. Section 1.132). It is respectfully requested that this Declaration be considered in connection with the above-identified patent application.

I, Sanford D. Porter, declare as follows:

1. I was awarded a Bachelor of Science degree in Zoology (cum laude) by Brigham Young University, Provo, Utah, in 1978.

At Brigham Young University, I was an Honors Program Graduate (High Honors).

2. During graduate study at Brigham Young University, I received the D. Eldon Beck Award ($1,000) as the outstanding graduate student in natural history in 1979, and, in 1980, I became a member of the Sigma Xi honors fraternity.

3. In 1980, the degree of Master of Science in Zoology and Entomology was conferred upon me by Brigham Young University.

4. In 1982, during my doctoral studies at Florida State University, Tallahassee, Florida, I received the Robert T. Gast Award presented by the Entomological Society of America at its Southeastern Branch Meetings for the best student paper on insects.

5. I was awarded a Ph.D. in Biological Science by Florida State University in 1984.

6. From 1984 to 1986, I was the recipient of a National Science Foundation grant for an investigation of thermoregulation and the effects of temperature on imported fire ants. This grant was based on a proposal written by me and submitted with Dr. Walter R. Tschinkel, who is a professor at Florida State University.

7. From 1977 to 1980, I was a research assistant at the Department of Zoology of Brigham Young University. My responsibilities included conducting research on harvester ant social structure and population dynamics as part of an environmental monitoring program funded by the U.S. Department of

Energy.

8. I received a yearly research stipend from 1980 to 1984 as a psychobiology trainee from the Psychobiology Research Center of the Department of Biological Science at Florida State University, during which time I investigated economic benefits of worker polymorphism in imported fire ant colonies.

9. From 1984 to 1986, I was a postdoctoral research associate at the Department of Biological Science of Florida State University, during which time I carried out research under the National Science Foundation grant referred to in paragraph 6, above.

10. Since 1986, I have been a research associate and lecturer at the Department of Zoology of the University of Texas, Austin, Texas. Besides supervising student research projects and teaching general biology, I have worked under Roger A. Mulder, imported fire ant program coordinator, to conduct basic research on fire ant biology and to provide technical advice and training to the Texas Department of Agriculture regarding fire ants, as well as testing new control products for fire ants. My offices are located at Brackenridge Field Laboratory and the Department of Zoology, University of Texas, Austin, Texas 78712. My work telephone number is (512) 472-2783.

11. I am a member of the Entomological Society of America, the International Union for the Study of Social Insects, the Cambridge Entomological Society, and the Florida and Kansas Entomological Societies.

12. I have spoken at symposia and presented invited lectures on the subject of imported fire ants. These include:

"Effects of the Imported Fire Ant, Emphasizing the Invertebrate Ecosystem," Texas Governor's Symposium, The Imported Fire Ant: Assessment and Recommendations, Austin Texas, October, 1988;

"Recent developments in Fire Ant Research," American Farm Bureau Federation, Fire Ant Advisory Committee Meeting, San Antonio, Texas, April, 1988;

"Thermoregulation and the Effects of Temperature on Fire Ants," Department of Entomology, Texas A&M University, September, 1987;

"Fire Ant Thermoregulation," Insects Affecting Man and Animals Research Laboratory, USDA-ARS, Gainesville, Florida, July, 1987; and

"Fire Ant Polymorphism: Adaptive Value of Worker Size Variation," Cambridge Entomological Society, Harvard University, March, 1985.

13. I have also authored various journal articles on the subject of imported fire ants. These include:

"Impact of Temperature on Colony Growth and Developmental Rates of the Ant, Solenopsis invicta," J. Insect Physiol., 34:1127-1133 (1988);

"Invasion of Red Imported Fire Ants (Hymenoptera: Formicidae): Microgeography of Competitive Replacement," Ann. Entomol. Soc. Am., 81:913-918 (1988) (with B. Van

Eimeren and L.E. Gilbert);

"The Efficiency of Sperm Use in Queens of the Fire Ant Solenopsis invicta Buren," Ann. Entomol. Soc. Am., 81:777-781 (1988) (with W.R. Tschinkel);

"Foraging in the Fire Ant, Solenopsis invicta (Hymenoptera: Formicidae): Effects of Weather and Season," Environ. Entomol., 16:802-808 (1987) (with W.R. Tschinkel);

"Adaptive Value of Nanitic Workers in Newly Founded Imported Fire Ant Colonies (Hymenoptera: Formicidae)," Ann. Entomol. Soc. Am., 79:723-726 (1986) (with W.R. Tschinkel);

"Fire Ant Polymorphism: The Ergonomics of Brood Production," Behav. Ecol. Sociobiol., 16:323-336 (1985) (with W.R. Tschinkel); and

"Fire Ant Polymorphism (Hymenoptera: Formicidae): Factors Affecting Worker Size," Ann. Entomol. Soc. Am., 78:381-386 (1985) (with W.R. Tschinkel).

Another journal article on fire ants, which I authored with E.L. Vargo, entitled "Colony Reproduction by Budding in the Polygyne Form of the Fire Ant, Solenopsis invicta (Hymenoptera: Formicidae)," will soon be published in Ann. Entomol. Soc. Am. Various additional journal articles authored solely by me or in collaboration with others on fire ants have been submitted for publication.

14. A copy of my current curriculum vitae listing other credentials is attached hereto as Exhibit I.

15. I have investigated imported fire ants for nine (9)

years. The University of Texas cooperates with the Texas Department of Agriculture to investigate fire ants and fire ant controls. In my present position at the University of Texas, I perform tests on new control products for fire ants. The search for effective fire ant control products is ongoing.

16. I have known Robert R. Milks, the applicant in this patent application, for several months. I first met Mr. Milks when he approached the Texas Department of Agriculture for evaluation of a new imported fire ant control product and was referred to me.

17. At that time, I reviewed a document submitted to me by Mr. Milks, which I understand is a copy of the patent application of Mr. Milks, as filed at the U.S. Patent and Trademark Office.

18. I subsequently requested formulations of the delayed-action insecticide in accordance with the disclosure in the patent application from Mr. Milks. Mr. Milks provided the formulations, as I requested. These formulations have been tested under my direction in accordance with customary testing protocols established within the University of Texas for the evaluation of new control products for imported fire ants. Attached as Exhibit II is a journal manuscript which I drafted to report the results of the tests on the formulations submitted by Mr. Milks.

19. Mr. Milks has requested that I review the May 15, 1989 U. S. Patent and Trademark Office Examiner's Action rejecting his patent application and submit a declaration regarding the

application. I agreed to cooperate without remuneration from Mr. Milks.

20. I understand that the patent application of Mr. Milks claims a composition or formulation for a delayed-action insecticide and a process for producing this insecticide. This delayed-action insecticide consists of a surfactant, such as a fluorochemical surfactant (fluorosurfactant), which is insoluble in vegetable oil. This surfactant is the active ingredient or toxicant. The insecticide further consists of a carrier, such as dried yellow corn meal, corn grit, crushed wheat, cracked wheat, etc., which is a source of food for the insect, such as imported fire ants. Formulations consist of the surfactant dissolved in a solvent and then absorbed onto the carrier, soybean oil then preferably being applied as an attractant. The claimed invention also provides a process for producing the delayed-action insecticide by dissolving the surfactant in a solvent, such as acetone or methanol, and mixing the resulting solution with the carrier.

21. I understand that the Examiner contends that:

> ". . .the disclosure [of the patent application of Mr. Milks] is enabling only for claims limited to the disclosure at pages 8-12 concerning specific surfactants, carriers, and amounts of ingredients."

Although the patent application of Mr. Milks provides examples for a specific surfactant, the properties of a surfactant that would qualify it as a candidate for a delayed-action insecticide are described to a sufficient extent in the application that I understand the characteristics of the active ingredient used in

the formulation. I note, for example, page 6, lines 6-8 of the application ("The active ingredient of the insecticide is selected from a class of materials known as surfactants.") and the description of the properties of surfactants that qualify them for selection as the active ingredient, as described on page 6, line 9 to page 8, line 22 of the application. I further understand that amended independent claims 1 and 11 recite:

> "1. A delayed-action insecticide consisting of a vegetable oil insoluble surfactant, the surfactant being applied in an insecticidal concentration in solution to a carrier to form a toxic bait."

> "11. A method for producing a delayed-action insecticide consisting of a vegetable oil insoluble surfactant and a carrier to form a toxic bait, comprising the steps of:
> dissolving the surfactant in a solvent;
> applying a sufficient amount of the surfactant/solvent solution to the carrier to provide an insecticidal concentration, thereby moistening the carrier; and
> evaporating the solvent from the carrier."

The meaning of the claim language "vegetable oil insoluble surfactant" is clear to me in view of page 4, lines 15-21 of the application which states:

> "The present invention provides an effective delayed-action insecticide. . .consisting of a surfactant, preferably a fluorochemical surfactant (fluorosurfactant), as the active ingredient. The fluorosurfactant is insoluble in vegetable oil."

Also, the application states on page 4 in lines 3-6:

> "Table 9 lists $C_8F_{17}SO_3K$, otherwise known as FC-95 available from 3M Company, St. Paul, Minnesota. . . .FC-95 is totally insoluble in vegetable oils, such as soybean oil."

Moreover, the meaning of the claim language "carrier" is clear to me based on page 4, lines 21-23 of the application ("The

insecticide further consists of a carrier, which is a source of food for the IFA or other insect.") and page 14, lines 8-10 of the application ("The carrier can comprise corn grit, crushed wheat, cracked wheat, or other grain, or another suitable material."), as well as the fact that the term "carrier" is generally understood by those having skill in the art. Also, the meaning of the claim language "anionic fluorochemical surfactant" recited in original claim 2, for example, is clear in view of page 8, lines 23-30 of the application which states:

> ". . .preferably, an anionic fluorochemical surfactant (fluorosurfactant), for example, . . .FC-95,. . .is the active ingredient of the delayed-action insecticide in accordance with the invention."

Furthermore, the claim language "potassium perfluoroalkyl sulfonate having a chemical formula of $C_nF_{2n+1}SO_3K$, where n equals 6 or 8" recited in original claim 3 is clear to me in view of page 8, lines 23-32 of the application (". . .preferably, an anionic fluorochemical surfactant (fluorosurfactant), for example,. . .FC-95,. . .is the active ingredient of the delayed-action insecticide in accordance with the invention. FC-95 can be generally described as a potassium perfluoroalkyl sulfonate, $C_nF_{2n+1}SO_3K$, where n preferably equals 6 or 8.").

22. I understand that the Examiner also contends that:

> ". . .the absence of specific amounts and/or ratios of active ingredients in claims 1-9 and 11-18 is not warranted by the disclosure."

The reference to "an insecticidal concentration" in amended claims 1 and 11 is clear to me, since the determination of the optimum amount of active ingredient to employ in compositions

needed to eradicate imported fire ants or other insects is well within the grasp of a skilled artisan in view of the disclosure in the patent application of Mr. Milks.

23. I have reviewed a) Vander Meer, R.K., Chemical Abstracts, Vol. 100, No. 1, 2205c, January 2, 1984, p. 193, hereafter referred to as "Chemical Abstracts;" and b) "Laboratory and Field Evaluation of Several Organochlorine and Organophosphorus Compounds For Control of Imported Fire Ants," Agricultural Research Service, U.S. Department of Agriculture, ARS-S-169, October, 1977, pp. 2-3, hereafter referred to as "the Laboratory article." I have also reviewed Vander Meer, R.K., Lofgren, C.S., and Williams, D.W., "Fluoroaliphatic Sulfones: A New Class of Delayed-action Insecticides for Control of Solenopsis invicta (Hymenoptera: Formicidae)," Journal of Economic Entomology, Vol. 78, No. 6, December, 1985, pp. 1190-1197, hereafter referred to as "Vander Meer, et al., 1985."

24. I have not reviewed the document on which Chemical Abstracts is based. Accordingly, I am only able to comment about what is disclosed in Chemical Abstracts.

The toxicant (active ingredient) specifically disclosed in Chemical Abstracts that was tested on insects, including imported fire ants, is $C_8H_{17}SO_2NHC_2H_5$. This compound is vegetable oil soluble, as indicated in the left hand column on page 1196 of Vander Meer, et al., 1985. Therefore, this compound is different from the active ingredient or toxicant in the delayed-action carrier insecticide disclosed and claimed in the patent

application of Mr. Milks. Moreover, this compound includes an SO_2 group and is therefore different from the delayed-action insecticide defined in claims 3-6 of the application, which recite a surfactant including an SO_3^- (sulfonate group) functionality.

25. The investigation disclosed in the Laboratory article was conducted by the U.S. Department of Agriculture (USDA). Subsequently, as a result of a later investigation, the same agency reported in Vander Meer, et al., 1985 at page 1196 that:

> "Consequently, oil solubility is an essential property for any potential RIFA [red imported fire ant] toxicant."

Accordingly, a person having ordinary skill in the art would be dissuaded from considering the use of a vegetable oil insoluble compound as the active ingredient or toxicant in a delayed-action carrier insecticide. In contrast, the delayed-action carrier insecticide disclosed and claimed in the patent application of Mr. Milks uses a vegetable oil insoluble compound as the active ingredient or toxicant. Furthermore, since the specific toxicant disclosed in Chemical Abstracts is vegetable oil soluble and since the later investigation by the USDA concludes that oil solubility is essential, there is no logical reason in view of Chemical Abstracts and Vander Meer, et al., 1985 to consider the use of acetone as a solvent, as disclosed in the earlier Laboratory article.

26. Table 9 on page 1196 of Vander Meer, et al., 1985 lists $C_8F_{17}SO_3K$, known as FC-95 available from 3M Company, St. Paul, Minnesota, which is indicated to have been formulated at a

1.0 % concentration in honey/water (1:1) and tested against the red imported fire ant. This article states in the left hand column on page 1196:

> "Large-scale RIFA [red imported fire ant] control is most effectively done with toxicants formulated in baits. Formulations consist of the toxicant dissolved in soybean oil and then absorbed onto a suitable carrier (i.e., corn grits, pregel defatted corn grits). Solid suspensions are not suitable because the RIFA workers have a sophisticated and efficient mechanism for filtering submicron particles from ingested food (Glancey et al. 1981). Consequently, oil solubility is an essential property for any potential RIFA toxicant. All of the compounds discussed above were soluble to at least 1 % in soybean oil. However, a group of compounds that fit the generalized R_fSO_2A structure were water-soluble. These materials were formulated in honey/water (1:1) and tested against the RIFA in the standard bioassay."

This article concludes in the right hand column on page 1196 that "the solubility properties of the compounds listed in Table 9," including FC-95, "make them poor candidates for RIFA control." Although the imported fire ant workers have a sophisticated and efficient mechanism for filtering minute particles from ingested food, the FC-95 absorbed onto the carrier in baits produced by Mr. Milks is in fact not effectively filtered by fire ants.

27. I state in my attached manuscript that:

> "Two sulfonates were tested ([by] Vander Meer et al. 1985), but eliminated from further screening because of poor oil solubility." See page 3, lines 7-9 of my manuscript.
>
> "Results in Table 1 [of my manuscript] clearly show that oil solubility is not necessary for the function of a sulfonate bait. Secondly, results in this paper suggest a much wider range of effective doses than indicated by Vander Meer et al. (1985). These authors rated sulfonates as class III compounds. . . ." See page 5, lines 22-25 of my manuscript.
>
> "Overall, [my] results indicate that sulfonates should be rated as a class IV toxicant (10- to 100-fold dose range) based on worker mortality or a class V toxicant (>100-fold

dose range) based on queen mortality." See page 6, lines 5-7 of my manuscript.

Vander Meer, et al., 1985 clearly discourages future use of the vegetable oil insoluble surfactant (sulfonate) toxicant disclosed in the patent application of Mr. Milks. In fact, it is unlikely that anyone familiar with this article would consider further testing of this compound as a toxicant. The high mortality rates which I obtained during tests of the vegetable oil insoluble surfactant (sulfonate) toxicant disclosed in the patent application of Mr. Milks are clearly unexpected in view of Vander Meer, et al., 1985.

28. The opinions expressed in this declaration are those of myself and not necessarily those of the University of Texas or the Texas Department of Agriculture, under whose auspices I conducted the tests on the vegetable oil insoluble surfactant (sulfonate) toxicant disclosed in the patent application of Mr. Milks. The statements made in this declaration are for informational purposes only and are not intended as an endorsement of either the applicant or commercial products based on his patent application.

I further declare that all statements made herein of my own knowledge are true, and that all statements made on information and belief are believed to be true; and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may

jeopardize the validity of the application or any patent issuing thereon.

Dated: 4 Sept 89

Sanford D. Porter